

Trickledown Effect?

Maternal Alcohol Consumption Linked to Cryptorchidism in Sons

Cryptorchidism (undescended testes), the most frequently occurring genital malformation in newborn boys, is a risk factor for later testicular cancer and fertility problems. By some reports, incidence has increased in recent decades, with environmental and lifestyle factors as potential contributors. As part of a broader investigation of these factors, a study of alcohol consumption during pregnancy reveals that imbibing five or more drinks per week may increase the risk of cryptorchidism [*EHP* 115:272–277; Damgaard et al.].

Prenatal alcohol exposure has already been linked to low birth weight and fetal alcohol syndrome, a spectrum of neurological and developmental problems. It may also be associated with abnormalities of the bones, heart, and genitourinary tract. Health experts generally advise women to avoid alcohol in pregnancy because research has not identified a safe level of consumption. Defining health effects due solely to alcohol consumption is complicated, though, owing to numerous confounding factors. For example, mothers in the current study who drank alcohol were also more likely to smoke, a factor associated with low birth weight, which in turn is linked to cryptorchidism.



Booze and boys. A new study links alcohol consumption during pregnancy with reproductive effects in sons.

The researchers used prospectively collected medical history and lifestyle data from 4,957 pregnant women in Denmark and Finland. These women had completed a self-administered questionnaire by the beginning of the third trimester of pregnancy, answering questions on alcohol, coffee, and tea consumption, as well as smoking. The 2,475 participating women gave birth to 2,496 sons, who were examined for cryptorchidism at birth and at three months. At birth, 128 boys had varying degrees of cryptorchidism, and at three months 33 remained cryptorchid.

Half the boys with transient cryptorchidism and nearly 70% of those with persistent cryptorchidism were born to mothers who did not drink at all. Nevertheless, data analysis showed that mothers who regularly drank alcoholic beverages during pregnancy were more likely to have sons with cryptorchidism, with an apparent dose–response trend. The association held even after controlling for smoking, maternal age, birth weight, caffeine intake, and other potential confounders.

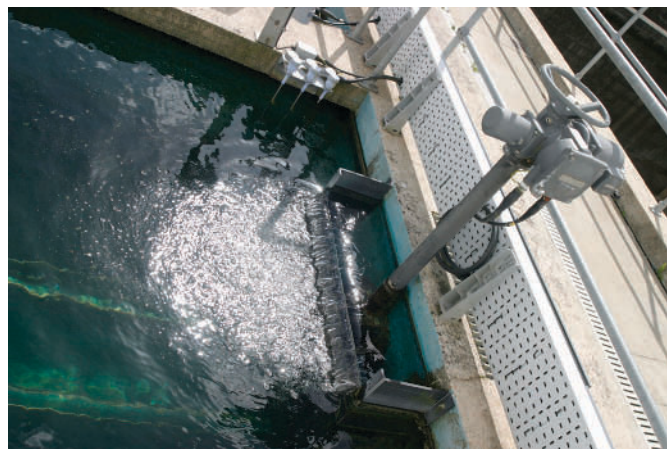
Although adverse effects were not statistically significant below five drinks per week, the researchers caution that their data do not support any conclusion regarding a safe level of drinking during pregnancy. They also cannot rule out some

contribution to overall adverse effects from examined confounders, such as smoking, as well as those for which data were not collected, such as diet. —Julia R. Barrett

Chloramine Catch

Water Disinfectant Can Raise Lead Exposure

Many water treatment systems around the nation have stopped using chlorine to disinfect drinking water. Chlorine reacts with dissolved organic matter in water to create by-products that are suspected of causing human health problems, including some forms of cancer. Many water treatment plants now use disinfectants called chloramines, combinations of chlorine and ammonia. But in some water systems this switch has coincided with an increase in lead in drinking water, perhaps because chloramines cause lead to leach from pipes, fixtures, and solder. Now a team of researchers from Duke University



Trading effects? Chloramines do not create toxic by-products like chlorination but may increase residents' lead exposures.

has measured the potential effect of switching from chlorine to chloramines on blood lead levels [*EHP* 115:221–225; Miranda et al.].

The scientists used geographic information system–based software to link blood lead data, housing data (dissolved lead in water can occur only when a lead source is present, a condition that is much more likely in older housing), drinking water sources, and census data for 7,270 children in Wayne County, North Carolina. Blood lead data were obtained from a statewide registry of all blood lead screens conducted on North Carolina children under the age of six. The authors noted that the lead-screened children were well distributed across different ages of housing in Wayne County.

The county has two main public water systems. About 70% of the residential tax parcels get drinking water through Wayne Water Systems, which uses chlorine for disinfection. Another 28% of parcels get drinking water through the Goldsboro Water System, which has used chloramines for disinfection since March 2000.

The Goldsboro Water System's change to chloramines was associated with an increase in children's blood lead levels, suggesting that use of chloramines could lead to an increase in lead exposure. The impact of the change to chloramines was progressively mitigated in newer housing, however. In houses built after 1950, the newness of the home was a stronger influence on blood lead than the use of chloramines.

Much uncertainty still surrounds the underlying environmental chemistry of how combinations of disinfectants, anticorrosives, coagulants, and fluoridation agents combine with water qualities such as pH, alkalinity, temperature, oxidation potential, and concentrations of other chemical species to affect lead in drinking water. Nevertheless, these results provide guidance to both water systems and health departments on which houses should be targeted for monitoring of lead in both water and residents' blood. —John Tibbetts

Another Look at Succimer

Cognitive Deficits May Be Reversible After All

Clinicians for years have used chelation to treat lead poisoning without knowing whether it prevented cognitive impairment in lead-exposed children. A recent study of chelation therapy now brings new hope to parents of children exposed to lead [EHP 115:201–209; Stangle et al.]. The Cornell University study is thought to be the first to show that chelation can alleviate cognitive deficits caused by lead exposure. That finding contradicts the most comprehensive chelation study to date, in which scientists at the NIEHS found no cognitive benefits of the therapy.

Chelation's known effect is to cause lead and other metals to be removed quickly from the blood and excreted in urine and feces. The treatment originally was used to prevent death from toxic exposures. Today, though, with the phaseout of leaded gasoline, solders, and paint, nonoccupational exposures are at much lower levels, and typically come from lead-bearing paint and dust in old houses.

In young children, however, even low lead levels can cause learning disabilities, attention difficulties, and antisocial behavior. Clinicians use chelation in children to minimize that risk, despite uncertainties about its effects in this regard. Treatment is recommended by the CDC if the child's blood lead level exceeds

45 µg/dL. Yet a CDC survey showed many children are treated for levels as low as 10 µg/dL.

The Cornell researchers tested the commonly used chelation drug succimer on juvenile rats fed lead doses that simulated moderate and high childhood exposures. For the lead-exposed rats, chelation was linked with an effective lessening of problems in cognition and emotionality, with a more complete normalization of behavior seen in the moderately exposed rats. An unexpected finding was that rats not exposed to lead but treated with succimer showed cognitive deficits similar to those of untreated rats with high lead levels during early development.

The authors believe that succimer might similarly improve cognition in lead-exposed children if a regimen could be identified that sufficiently reduces brain lead. Succimer's reduction of brain lead lags behind its effect on blood lead. The authors suggest that the failure of the NIEHS study to show any cognitive benefits of succimer may reflect the small reduction in blood lead—and even smaller reduction in brain lead—achieved by the treatment relative to placebo.

The Cornell team could not explain why succimer produced lasting adverse effects in rats not exposed to lead, but speculated it might be related to the drug's effect on essential metals such as iron and zinc, which are necessary for proper brain development. Their finding led them to warn against using chelation in children who do not have elevated tissue levels of lead or other heavy metals. —Cynthia Washam



Succimer for success? A new rat study suggests that chelation may negate some cognitive effects of lead exposure.

Mapping a Course for PFCs

Transfer Between Mothers' Milk and Serum

Studies have found assorted perfluorinated compounds (PFCs)—the persistent chemicals in such products as nonstick coatings—in samples of human blood and milk, but what isn't clear is how efficiently the chemicals transfer between these two media. To address this gap, researchers in Sweden compared PFC levels in blood serum and milk samples to better understand the lactational transfer of these compounds [EHP 115:226–230; Kärrman et al.].

Previous animal and human studies have shown that mothers can pass certain PFCs to fetuses and infants. That these compounds can find their ways into humans at the earliest stages is cause for concern because the PFCs perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which have infiltrated ecosystems from Asia to Antarctica, have been linked in laboratory animals to effects that include liver and testicular cancer, developmental defects, immune disruption, neuroendocrine effects, and birth defects.

The team collected milk and blood samples from 12 women at three weeks postpartum. The team also compared PFC levels from this relatively small sample to levels in human milk samples collected from 1996 through 2004 from groups of 25 to 90 women per year.

The team found eight PFCs in the current serum samples and five in the current milk samples. All of these milk samples contained PFOS (which was also the compound with the highest mean concentration) and perfluorohexanesulfonate. Some also contained PFOA, perfluorooctanesulfonamide, or perfluorononanoic acid. These patterns and levels were similar to those detected in the earlier milk samples.

The scientists calculated that the breast milk PFC concentration averaged about 1% of the corresponding maternal serum concentration.



Lactation equation. A new study shows that PFCs are transferred into breast milk at concentrations about 1% of maternal serum levels.

They write that the estimated levels of PFCs that infants received from mothers (about 200 ng per day) could represent a substantial exposure, and call for further studies of the potential hazards of PFCs in breast milk.

They also found that the relationship between serum and milk PFC levels depends on the specific compound. These differences, the scientists caution, may not necessarily indicate the efficiency at which the different compounds travel from whole blood to milk. Variables such as how readily each compound concentrates in blood plasma rather than whole milk may affect the ratios. —Scott Fields